

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCX360/43072	FOR FURTHER ACTION		See Form PCT/IPEA/416
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International Patent Classification (IPC) or national classification and IPC Int. Cl. 7 A63B 69/00, 69/18			
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<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of 10 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>

Date of submission of the demand 16 September 2005	Date of completion of the report 23 September 2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NZ2004/000291

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:

international search (under Rules 12.3 and 23.1 (b))
 publication of the international application (under Rule 12.4)
 international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished
 the description:
 pages 1 - 3 & 10 - 14 as originally filed/furnished
 pages* 4 - 9 received by this Authority on 16 September 2005 with the letter of 15 September 2005
 pages* received by this Authority on with the letter of

the claims:
 pages as originally filed/furnished
 pages* as amended (together with any statement) under Article 19
 pages* 15 - 18 received by this Authority on 16 September 2005 with the letter of 15 September 2005
 pages* received by this Authority on with the letter of

the drawings:
 pages 1/7 - 7/7 as originally filed/furnished
 pages* received by this Authority on with the letter of
 pages* received by this Authority on with the letter of

a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. The amendments have resulted in the cancellation of:

the description, pages
 the claims, Nos.
 the drawings, sheets/figs
 the sequence listing (*specify*):
 any table(s) related to the sequence listing (*specify*):

4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages
 the claims, Nos.
 the drawings, sheets/figs
 the sequence listing (*specify*):
 any table(s) related to the sequence listing (*specify*):

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NZ2004/000291

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.****1. Statement**

Novelty (N)	Claims 1 – 19	YES
	Claims	NO
Inventive step (IS)	Claims 1 – 19	YES
	Claims	NO
Industrial applicability (IA)	Claims 1 – 19	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)**NOVELTY (N); INVENTIVE STEP (IS) & INDUSTRIAL APPLICABILITY (IA)****Claims 1 – 19**

The applicant has amended the claims to more clearly define the invention including specifying a pivoting mount assembly for pivoting both the foot bindings together about a first simulator axis to simulate edge to edge roll movement of a board about its longitudinal or roll axis and that at least one of the foot bindings is attached to the pivoting member for sliding movement toward and away from the other foot bindings in the direction substantially parallel to the first simulator axis for adjusting the spacing there-between while the rider's feet are held by the foot bindings.

None of the documents cited in the International Search Report disclose this precise combination and arrangement of the pivoting mount assembly either on their own or in any obvious combination, rendering the invention defined in the present claims both novel and inventive over the cited prior art.

The invention defined in the present claims is suitable for industrial application.

All references, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein, this reference does not constitute an admission that any of these documents form part of the common general knowledge in the art, in New Zealand or in any other country.

It is acknowledged that the term 'comprise' may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term 'comprise' shall have an inclusive meaning - i.e. that it will be taken to mean an inclusion of not only the listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term 'comprised' or 'comprising' is used in relation to one or more steps in a method or process.

It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

20 **DISCLOSURE OF THE INVENTION**

According to one aspect of the present invention there is provided a simulator for board sports including:

a pair of foot bindings for holding a rider's feet;

a pivoting mount assembly for pivoting both the foot bindings together about a first

simulator axis to simulate edge-to-edge roll movement of a board about its longitudinal or roll axis, the pivoting mount assembly including a ground-supported base pivotally connected to a pivoting member to which at least one of the foot bindings is attached for movement toward and away from the other of the foot bindings, and

5 adjustment means operatively connected to said at least one of the foot bindings for moving said at least one of the foot bindings toward and away from the other of the foot bindings to adjust the spacing between the pair of foot bindings while the rider's feet are held thereby.

The simulator allows a rider to simulate at least one pivoting movement that is made to manoeuvre a snowboard, or the like. The movement between the bindings toward and away from one another is preferably a linear movement. It will be understood that while a pivoting movement may move part of a binding toward and away from the other binding, the relative movement must be of the whole binding. Preferably the movement is linear sliding movement e.g. the at least one binding is fixed for sliding on a linear track, in a linear slot, or the like. The rider is thereby able to dynamically determine the effect of adjustments on the width of his stance (determined by the spacing between the foot bindings) on his ability to balance about the first simulator axis.

In the preferred embodiment the pivoting of the foot bindings about the first simulator axis is adapted to simulate edge-to-edge roll movement of a board about its longitudinal or roll axis, the at least one of the foot bindings, or both of the foot bindings, being mounted for sliding movement in a direction substantially parallel to the first simulator axis. It will be understood that pivoting about the longitudinal or roll axis of a board is important in steering the board to transfer weight between the opposing longitudinal edges of the board.

Optionally the simulator may be adapted for simulating pivoting or rotation about a pitch axis and/or about a yaw axis of the board. In addition to pivoting about the first simulator axis therefore, the simulator may include means for pivoting both the foot bindings together about mutually orthogonal pitch and yaw axes, both of which are 5 perpendicular to the first simulator axis.

Advantageously the foot bindings are fixed together for pivoting about the first simulator axis. The foot bindings may be fixed to a platform for simulating a snowboard, or the like. Most preferably, for simulating the manner of mounting foot bindings on a snowboard, the foot bindings include boot bindings. A support is fixed to 10 the pivotal attachment for supporting the foot bindings, preferably upon the ground. A handle may be fixed to the support to assist the rider and prevent a fall.

The pivoting mount assembly preferably includes at least one resilient pivot connecting the ground-supported base and pivoting member to provide the pivoting movement about the simulator axis while also biasing a foot-supporting surface of each foot 15 binding toward the horizontal plane. Alternatively, the pivotal attachment may include a journal and separate resilient means.

Most preferably the pivoting mount assembly includes two elastomeric pivots, at least one of which is mounted for sliding movement parallel to the first simulator axis for movement between a widely spaced position to provide substantially roll movement of 20 the boot bindings about the first axis, and any one of more closely spaced positions configured for providing an increased degree of pivoting movement of the bindings about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.

In a preferred embodiment both foot bindings are adapted to be simultaneously moved 25 for adjusting the spacing between the foot bindings in a direction substantially parallel to the first simulator axis. This may be achieved, for example, by a screw-type

adjuster, manually or power-operated linear actuators etc. Optionally one or both foot bindings are fixed in a track extending parallel to the first simulator axis for movement to adjust the spacing between the foot bindings. The means for adjusting the spacing between the foot bindings is preferably a screw-type adjuster, but it will be understood that other manually or power-operated linear actuators may also be used. The screw-type adjustment mechanism is preferably connected to the at least one foot binding for sliding the at least one foot binding toward and away from the other of the foot bindings for adjusting the spacing therebetween while the rider's feet are held by the foot bindings. When both the bindings are mounted for sliding movement the adjustment mechanism includes: a screw threaded adjuster rod having a handle; a screw block received on the adjuster rod; sliding blocks connected to the bindings, and an arm pivotally connected to each sliding block and to the screw block.

The simulator may further include means for measuring the spacing between the centres of the foot bindings, such as a ruler. An alignment indicating device, such as a plumb line or level, may also be provided to assist in aligning the centre of the rider's knee vertically with his foot. The alignment indicating device may include a knee-receiving cup fixed to each foot binding, the position of the knee-receiving cup being adjustable to align with the knees of different users, the cup being adjustable in a plane extending orthogonally to a foot-supporting surface of the binding and substantially aligned with the centre of the rider's foot. A rod assembly may be fixed to the binding, extending generally perpendicular to a base of the binding or platform and able to telescope to align vertically with the knees of different height users.

In addition to this freedom of adjustment of the foot bindings in the longitudinal direction, the simulator preferably includes means for adjustment of the foot bindings by rotation of each foot binding about a central axis substantially intersecting with and extending orthogonally to the first simulator axis for adjusting the angle between the midline of the foot and the first simulator axis.

Means may also be provided for movement of the foot bindings lateral to the first simulator axis. The means for means for providing each of these adjustments is preferably adapted to allow for adjustment while the rider is held in the foot bindings e.g. by a separate operator or by remote control means operated by the rider.

- 5 The simulator preferably further includes a rider's seat, upon which the rider may sit with his feet secured by the bindings. Additionally, an operator's seat may also be provided for seating an operator while he operates the adjustment mechanism. The rider's seat and operator's seats are preferably fixed on opposing sides of the pivoting mount assembly.
- 10 According to another aspect of the present invention there is provided a simulator for board sports including:
 - a pair of foot bindings for holding a rider's feet;
 - a pivoting mount assembly for pivoting both the foot bindings about a first simulator axis to simulate pivoting movement of a board, and characterised in that
- 15 the pivoting mount assembly includes two elastomeric pivots mounted for sliding movement parallel to the first simulator axis for movement between a widely spaced position to provide substantially roll movement of the boot bindings about the first axis, and any one of more closely spaced positions configured for providing an increased degree of pivoting movement of the bindings about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.
- 20

This invention provides a simulator which is effective and efficient in operational use, and which is versatile in operation, allowing it to be used to assist board riders determine their stance and also for training riders in different courses of movement. The simulator may be economically constructed and has an overall simple design which minimizes manufacturing costs.

BRIEF DESCRIPTION OF THE DRAWINGS

Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

- 5 Figure 1 is a perspective view of the simulator of the present invention;
- Figure 2 is an exploded view of the simulator of Fig. 1;
- Figure 3 is a front elevation of the simulator of Fig. 1;
- Figure 4 is an exploded pictorial view of the mount of the simulator of Fig. 1;
- 10 Figure 5 is an exploded pictorial view of part of the platform assembly of the simulator of Fig. 1;
- Figure 6 is an exploded pictorial view of the boot bindings of the simulator of Fig. 1, and
- Figure 7 is an exploded pictorial view of the alignment indicating device of the simulator of Fig. 1.

15 **BEST MODES FOR CARRYING OUT THE INVENTION**

Referring to Figs 1 - 3, a simulator 100 according to the present invention for board sports, and in particular snowboarding, is shown having a frame 30 with a rider's seat 31 and an operator's seat 32 positioned either side of a platform assembly 33 supported on a pivoting mount 34. The platform assembly 33 includes a platform 5
20 to which a pair of foot-bindings or boot bindings 2a, 2b are mounted for holding the a rider's feet while the mount 34 allows the platform assembly 33 to pivot primarily about a first simulator axis A to simulate edge-to-edge roll of a snowboard about its longitudinal centreline.

WHAT I CLAIM IS:

1. A simulator for board sports including:

a pair of foot bindings for holding a rider's feet;

a pivoting mount assembly for pivoting both the foot bindings together about a first simulator axis to simulate edge-to-edge roll movement of a board about its longitudinal or roll axis, the pivoting mount assembly including a ground-supported base pivotally connected to a pivoting member to which at least one of the foot bindings is attached for movement toward and away from the other of the foot bindings, and

adjustment means operatively connected to said at least one of the foot bindings for moving said at least one of the foot bindings toward and away from the other of the foot bindings to adjust the spacing between the pair of foot bindings while the rider's feet are held thereby.

2. The simulator of claim 1 wherein said at least one of the foot bindings, or both of the foot bindings, are mounted for sliding movement in a direction substantially parallel to the first simulator axis.

3. The simulator of claim 1 or claim 2 wherein the pivoting mount assembly includes a platform to which the foot bindings are fixed, the platform pivoting about the first simulator axis and simulating a snowboard.

4. The simulator of any preceding claim wherein the first simulator axis is below the foot bindings.

5. The simulator of any preceding claim wherein the pivoting mount assembly

Includes at least one resilient pivot connecting the ground-supported base and pivoting member to provide the pivoting movement about the simulator axis while also biasing a foot-supporting surface of each foot binding toward the horizontal plane.

6. The simulator of claim 5 wherein the pivoting mount assembly includes two elastomeric pivots, at least one of which is mounted for sliding movement parallel to the first simulator axis for movement between a widely spaced position to provide substantially roll movement of the boot bindings about the first axis, and any of one or more closely spaced positions configured for providing an increased degree of pivoting movement of the bindings about mutually orthogonal pitch and yaw axes, both of which are perpendicular to the first simulator axis.
7. The simulator of any preceding claim wherein the adjustment means comprises a screw-type adjustment mechanism connected to the at least one foot binding for sliding the at least one foot binding toward and away from the other of the foot bindings for adjusting the spacing therebetween while the rider's feet are held by the foot bindings.
8. The simulator of claim 7 wherein both the bindings are mounted for linear sliding movement and the adjustment mechanism includes:
 - a screw threaded adjuster rod having a handle;
 - a screw block received on the adjuster rod;
 - sliding blocks connected to the bindings, and
 - an arm pivotally connected to each sliding block and to the screw block.
9. The simulator of any preceding claim further including means for measuring the spacing between the foot bindings.

10. The simulator of any preceding claim further including an alignment indicating device to assist in aligning the rider's knees vertically with his respective foot.
11. The simulator of claim 8 wherein the alignment indicating device includes a knee-receiving cup fixed to each foot binding, the position of the knee-receiving cup being adjustable to align with the knees of different users, the cup being adjustable in a plane extending orthogonally to a foot-supporting surface of the binding and aligned with the centre of the rider's foot.
12. The simulator of claim 8 or claim 9 wherein the alignment indicating device includes a rod assembly fixed to the binding, extending generally perpendicular to a base of the binding or platform and able to telescope to align vertically with the knees of different height users.
13. The simulator of any preceding claim wherein each foot binding is mounted to the pivoting mount assembly for relative rotation about respective central axes substantially intersecting with and extending orthogonally to the first simulator axis for adjusting the angle between the midline of the foot and the first simulator axis.
14. The simulator of any preceding claim further including a rider's seat.
15. The simulator of claim 12 further including an operator's seat, the rider's seat and operator's seats being fixed on opposing sides of the pivoting mount assembly.
16. A method of determining a rider's stance for board sports, including:
providing a simulator as claimed in any one of claims 1 to 13;
fixing both the rider's feet in the foot bindings in an initial narrow stance;

adjusting the spacing between the foot bindings to broaden the rider's stance while the rider attempts to balance about the first simulator axis, and
measuring the spacing between the foot bindings.

17. The method of claim 14 wherein the simulator further includes an alignment indicating device to assist in aligning the rider's knees vertically with his respective foot, the method including, prior to step d), the further step of: using the alignment indicating device to align the rider's knees vertically with his feet.

18. The method of claim 14 or claim 15 wherein each foot binding is mounted to the pivoting mount assembly for relative rotation about respective central axes substantially intersecting with and extending orthogonally to the first simulator axis, the method including:

rotating each binding about its respective central axis to adjust the angle between the midline of the foot and the first simulator axis, and

measuring the angle between the midline of the foot and the first simulator axis.

19. A simulator substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.